Army Condition Based Maintenance Plus (CBM+)

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DALO-MNS

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ALWAYS THERE.

ALWAYS READY.

UNITED STATES ARMY LOGISTICS

PURPOSE

Provide a brief overview of current Army initiatives in implementing Condition Based Maintenance – Plus (CBM+) and the policy and governance role

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Agenda

- ❑ Why We Do CBM+
- ❑ Enterprise Architecture
- ❑ Policy Development
- ❑ Oversight Responsibility
- ❑ CBM+ Governance

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Why We Do CBM+

PREVENTIVE	INDICATORS	DIAGNOSTICS	PROGNOSTICS	ON-CONDITION

PREVENTIVE
- Reactive Maintenance
- Time Based Inspection/Overhaul

- Digital Source Collector Installation
- Knowledge Development
- Fault Diagnosis
- Remaining Useful Life Calculation
- Inspection Targeting

ON-CONDITION
- Proactive Maintenance
- 'On Condition' Inspection/Overhaul

CBM Program Objectives:

- Decrease Maintenance Burden on the Soldier
- Increase Platform Availability and Readiness
- Enhance Safety
- Reduce Operations & Support (O&S) Costs

The Purpose of Army Maintenance is to Generate Combat Power
AR 750-1

CURRENT
2,459 Aircraft
1,425 Missiles

CBM Demonstration since 06 on ~200 Wheeled Vehicles

FUTURE
500 Generators FY12
2,000 TWV's
FY12

Key CBM Enablers
▶ Digital Source Collectors
▶ Platform Diagnostics
▶ Data Fusion/Analysis

- Decreases the Cost of Readiness
- Enables Increased OPTEMPO
- Decreases Operational and Sustainment Risk by:
  - Reduced Potential for Equipment Loss
  - Decreased Need for Redundancy
  - Enabling Split Based Operations

Objective CLOE Integration

POST 1.2 (2017)
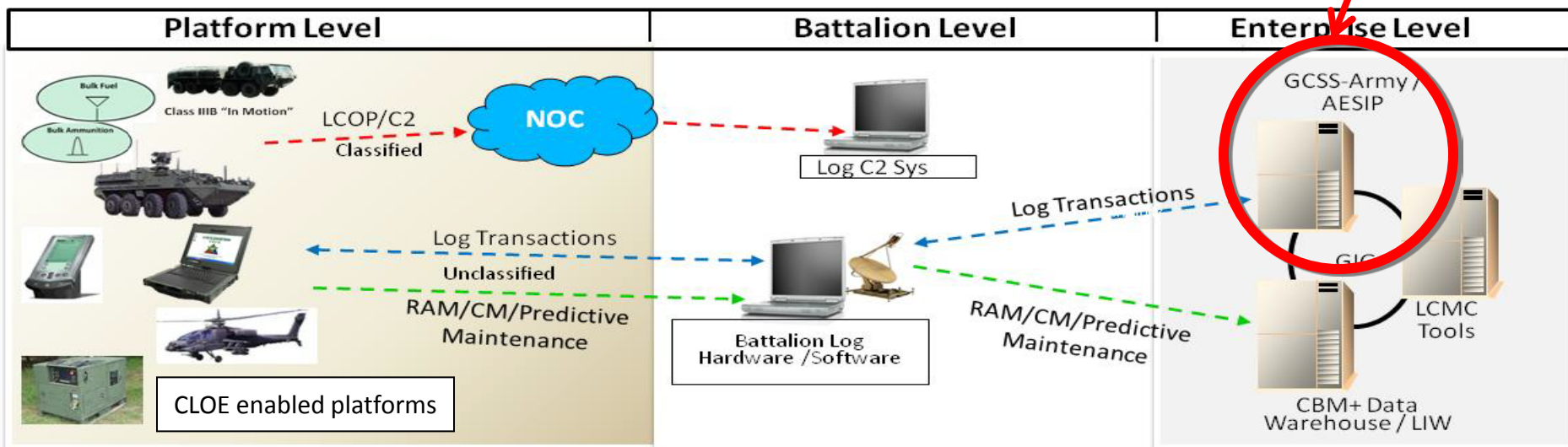
Army Integrated Logistics Architecture (AILA) & Net-Centric Data Standards

(Anticipatory Logistics/CBM+ Processes & Data Types)

| LCOP/C2	Log Transactions	RAM		CM	Pred. Maint
Vehicle & Supply Status (fuel, ammo, MC)	Maint/Supply Requests; Equipment Master Updates	Fault & Maintenance Action Logs	Equipment Operating / Usage History	Configuration Data	Bulk CBM Sensor Data

AESIP – Army Enterprise System Integration Program
CBM+ – Condition Based Maintenance Plus
CM – Configuration Management

C2 – Command & Control
LCOP – Logistics COP
LIW – Logistics Information Warehouse

MC – Mission Capability
NOC – Network Operations Center
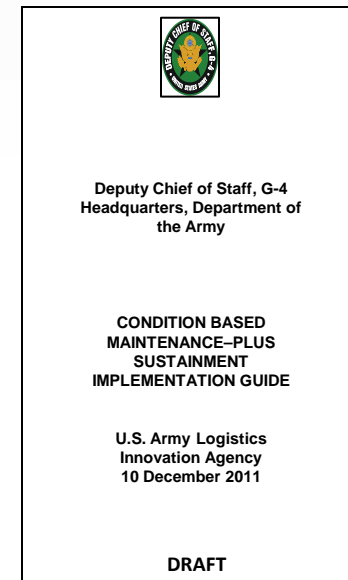RAM – Reliability/Availability/Maintainability

Gap in CBM+ Architecture
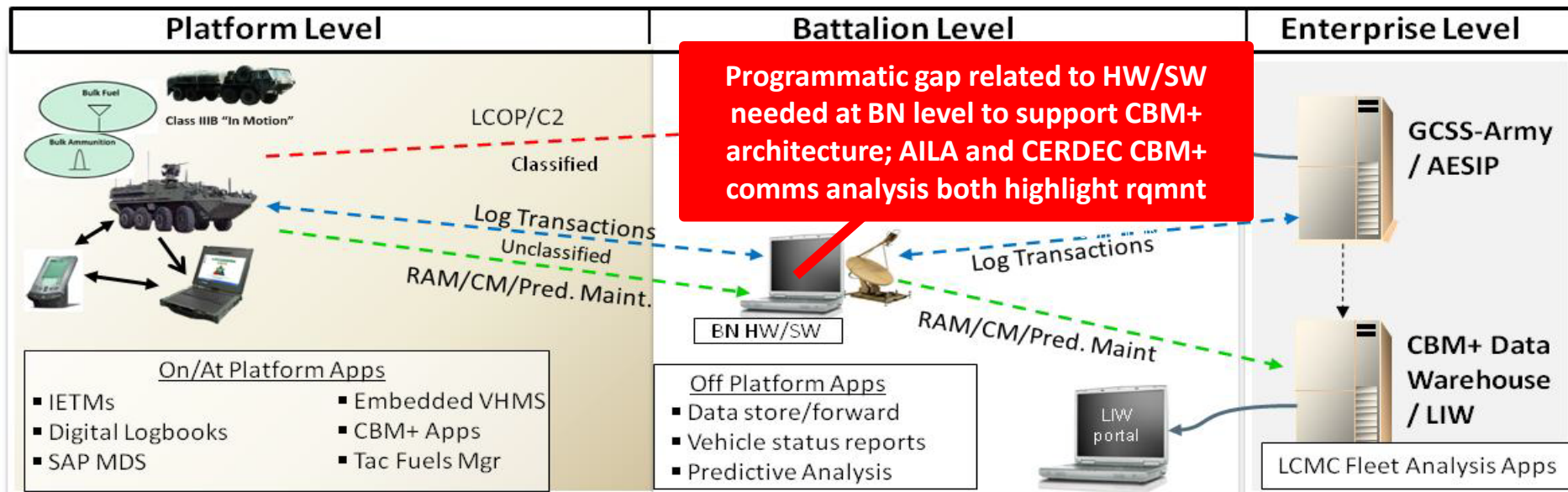
❑ Platform Level - PM TMDE (Maintenance Support Device (MSD)) is potential Program of Record (PORs) for hosting common CBM+ HW/SW

❑ Battalion Level – PM GCSS-Army/AESIP has requirement to support migration of CBM+ data, but this is not part of release 1.2

- G-4 guidance in Feb 2010 for LIA/CASCOM to introduce requirement to BPC/ERP Gov Council (following GCSS-Army integration risk reduction at PSU ARL)
- TBD when/if this capability would be programmed an follow on increment

❑ Enterprise Level – LOGSA has responsibility for CBM+ Data Warehouse/LIW; PM GCSS-Army/AESIP has requirement to support automated interface of log transactions, but the is not part of release 1.2.

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G4 CBM+ Roles & Responsibilities

❑ Policy Development
- ▪ Technical/Functional Support from LIA
- ▪ Coordination with ASAALT

❑ Oversight for Implementation
- ▪ Coordination through AMC

❑ POM Development
- ▪ Collect requirements
- ▪ Provide SS PEG recommendations

Deputy Chief of Staff, G-4
Headquarters, Department of the Army

CONDITION BASED
MAINTENANCE–PLUS
SUSTAINMENT
IMPLEMENTATION GUIDE

U.S. Army Logistics
Innovation Agency
10 December 2011

DRAFT

CBM+ Governance Review
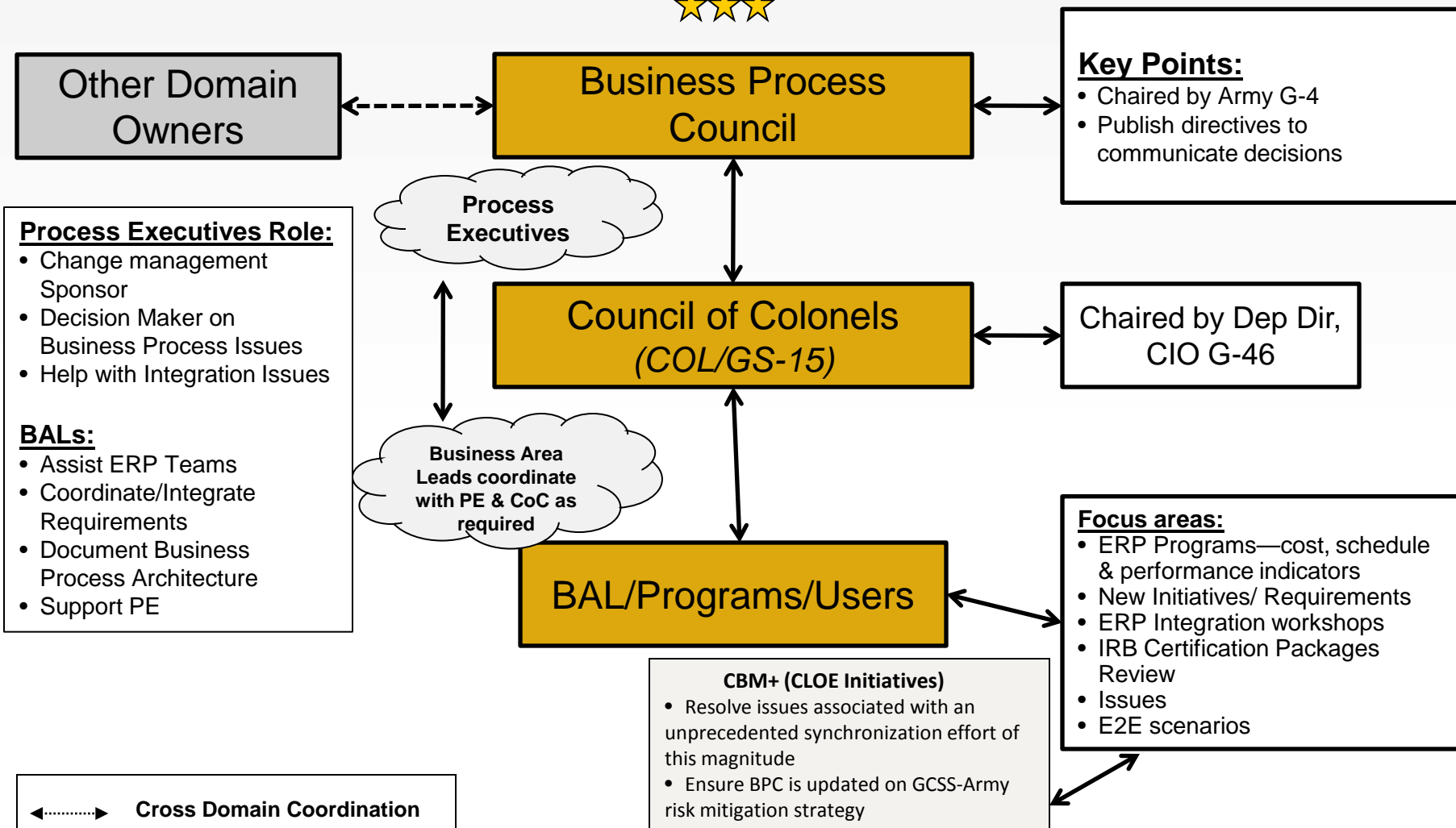
❑ The Business Process Council (BPC) is the Governing body for CBM+ and all issues that impact the SALE; is Chaired by the G4

❑ Under the BPC Process - Executives are in charge of each Functional Area, i.e. Maintenance (Mr. Lowman)

❑ Issue(s) are brought forward through the BPC Council of Colonels

❑Each LCMC should have an internal governing body as well as the AMC HQ governing body

Logistics Domain Governance

CBM+ Governance

★★★

Other Domain Owners

Business Process Council

Key Points:
- Chaired by Army G-4
- Publish directives to communicate decisions

Process Executives

Process Executives Role:
- Change management Sponsor
- Decision Maker on Business Process Issues
- Help with Integration Issues

BALs:
- Assist ERP Teams
- Coordinate/Integrate Requirements
- Document Business Process Architecture
- Support PE

Council of Colonels
(COL/GS-15)

Chaired by Dep Dir, CIO G-46

Business Area Leads coordinate with PE & CoC as required

BAL/Programs/Users

Focus areas:
- ERP Programs—cost, schedule & performance indicators
- New Initiatives/ Requirements
- ERP Integration workshops
- IRB Certification Packages Review
- Issues
- E2E scenarios

CBM+ (CLOE Initiatives)
- Resolve issues associated with an unprecedented synchronization effort of this magnitude
- Ensure BPC is updated on GCSS-Army risk mitigation strategy

◄┄┄┄┄► **Cross Domain Coordination**

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QUESTIONS?

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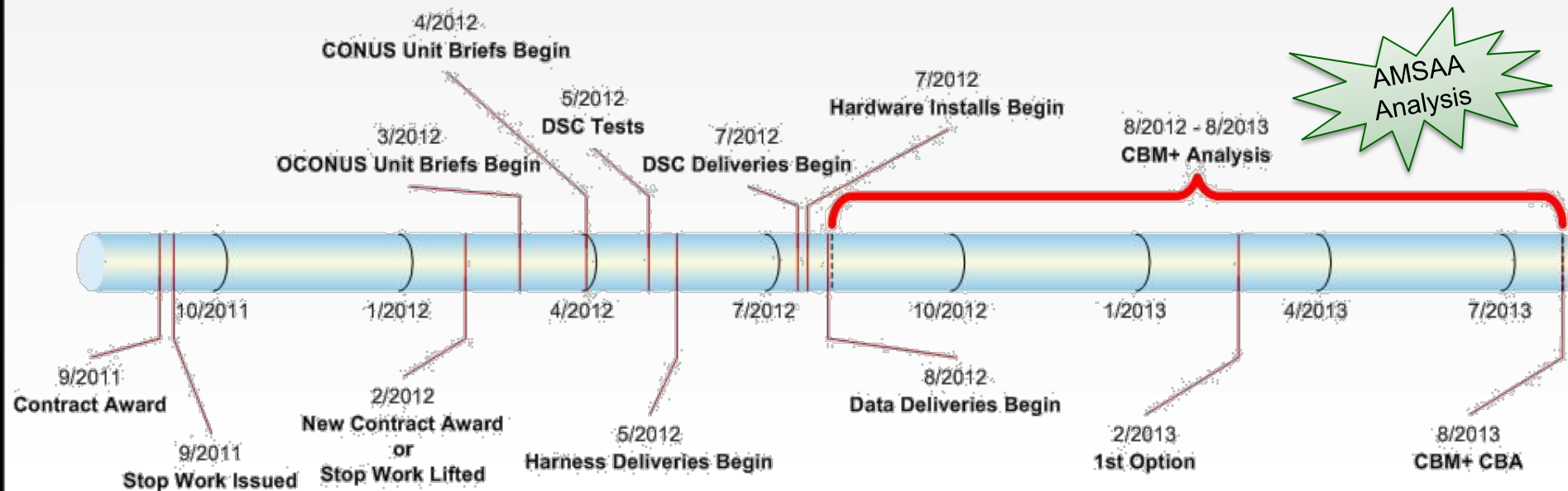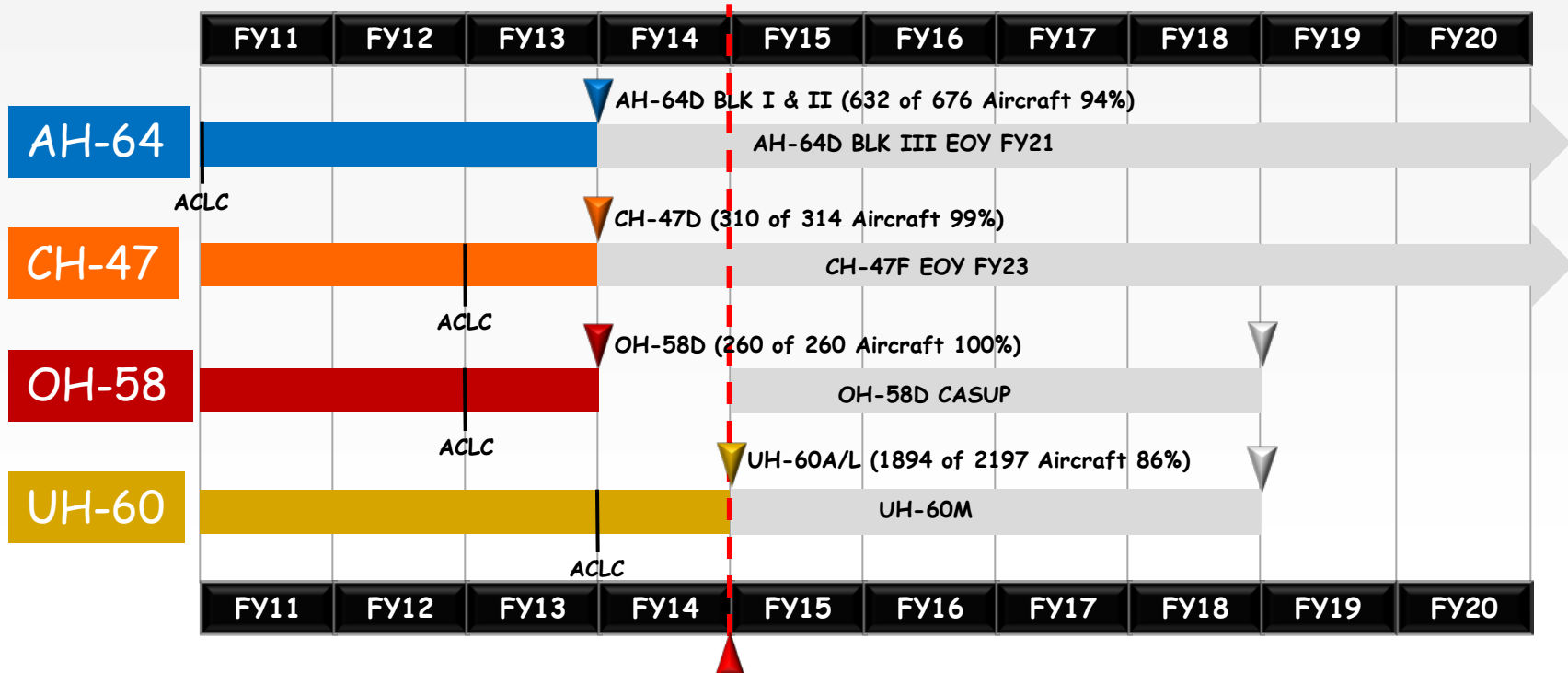
BACK-UP

CBM+ Pilot Milestones

❑ Partnerships in Execution, Analysis and Build
- AMSAA - Program Development and Execution
- PM TV - Program Development and Execution
- TYAD - DSC Harness build
- LOGSA - Data Storage and Management (CIMS)
- SED DISCoE - ABCD Standards Implementation
- LIA – CIMS/GDLB Incorporation
- PD TMDE - MSD V3 Implementation (CIMS/GDLB)
- TARDEC Industrial Base Integration Team: SERA and VisCom Tool for risk analysis and Industrial Base Capabilities

🛡 Industry Partnerships
- Penn State University ARL
- Control Point Corporation
- Pending PP Contractor

3 Sources for Data Analysis

DSC Forecast Update

	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20

AH-64
AH-64D BLK I & II (632 of 676 Aircraft 94%)
AH-64D BLK III EOY FY21
ACLC

CH-47
CH-47D (310 of 314 Aircraft 99%)
CH-47F EOY FY23
ACLC

OH-58
OH-58D (260 of 260 Aircraft 100%)
OH-58D CASUP
ACLC

UH-60
UH-60A/L (1894 of 2197 Aircraft 86%)
UH-60M
ACLC

	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20

3144 of 3732 Aircraft 84%

- **Additional ~ $71.68M Total Between FY12-14 Completes 100% of Available Fleet**
  - *$46.07M SAG 422* *$13.89M SAG 135* *$11.72M SAG 137*
- **Mitigates Risks in Lost Investment As Aircraft Are Divested / Converted**
- **Completes 100% of Training Fleet**

NOTES: - DSC installs conducted in conjunction with Reset may have completion date in FY15
        - Some aircraft are not in ARFORGEN pool

C4ISR Pilot Program

Pilot Intent:

▶ Conduct Operational Assessment of current capabilities deployed to field environments
▶ Transmit data, receive data, store data, retrieve and make decision with data from a data repository
▶ Execute holistic analysis
▶ Share and maintain integrity of information within integrated data environment
▶ Establish repeatable process for implementing and sustaining CBM+ solutions
▶ Develop CECOM CBM+ PIPP BCA

C4ISR Systems:

▶ 10kW-100kW TQG
▶ Command Post Platform (Power Supply/ECU)
▶ Rigid Wall Shelter Corrosion Study
▶ 60kW IECU

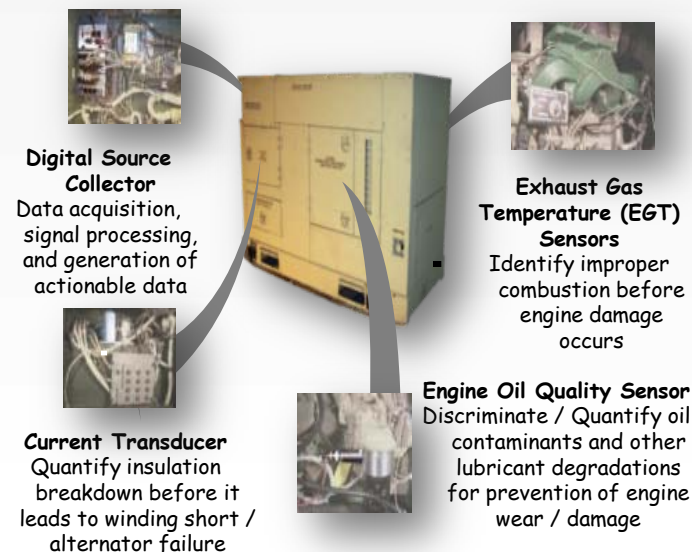### CECOM LRC Corrosion Study

GPS LOGGER

Temp/Humidity LOGGER

SEVERE / HIGH / INTERMED / MODERATE / LOW

▽ Assign corrosivity indices to each zone CONUS and OCONUS for each quarter of a year

▽ Monitor the amount of time and what time of the year the system spends in each zone using a GPS logging system and coupons

Simple, inexpensive h/w + existing environmental data = foundation of corrosion monitoring in CBM

C4ISR CBM+ Sensor Suite

Digital Source Collector
Data acquisition, signal processing, and generation of actionable data

Exhaust Gas Temperature (EGT) Sensors
Identify improper combustion before engine damage occurs

Current Transducer
Quantify insulation breakdown before it leads to winding short / alternator failure

Engine Oil Quality Sensor
Discriminate / Quantify oil contaminants and other lubricant degradations for prevention of engine wear / damage

▽ **Apply electronic LRU sensor suite to MEP-805B & MEP-806B TQGs to include:**
  ▶ Digital Source Collector
  ▶ Exhaust Gas Temperature Sensor
  ▶ Oil Quality Sensor
  ▶ Existing Sensors
  ▶ Fuel Quantity Sensor

▽ **Apply electro-mechanical sensor suite to Medium TQGs (10kW-100kW) to include:**
  ▶ Utilizing Existing Sensors on Platform
  ▶ Installing an upgraded CIMS from L-3 on MEP-805/6B TQGs
  ▶ Utilizing a Data Logger (Data Acquisition/Storage Capability)